Multiscale Investigation of Perennial Flow and Thermal Influence of Headwater Streams Into Fish Bearing Systems: An Update

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Research Objectives:

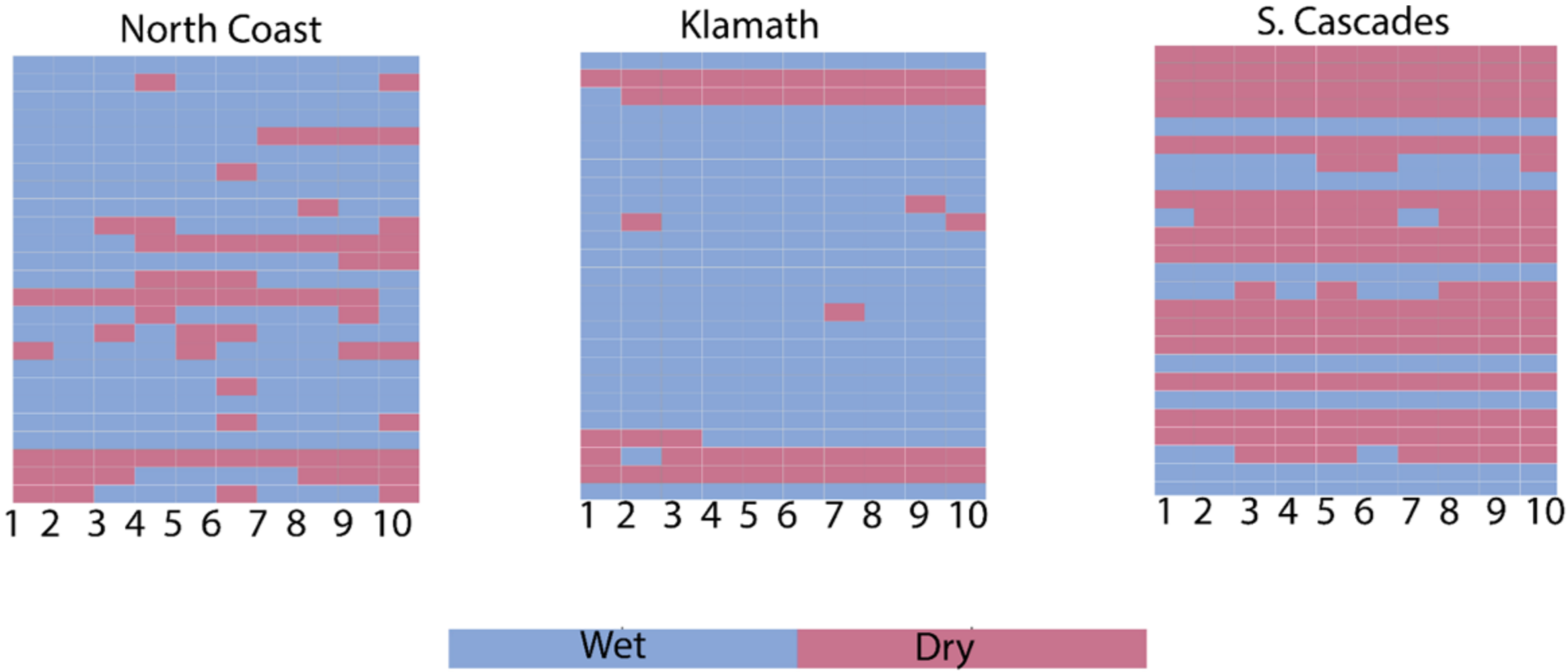
a) Investigate the variability of the relationship between drainage area, active channel width, and perennial flow extent across the Anadromous Salmonid Protection (ASP) area.

b) Compare the relationships derived in (a) to the rule criteria for Class II-L identification in terms of both drainage area and average active channel width; determine if these criteria are effective in identifying Class II-L watercourses in different lithologies, or if rule modifications are needed

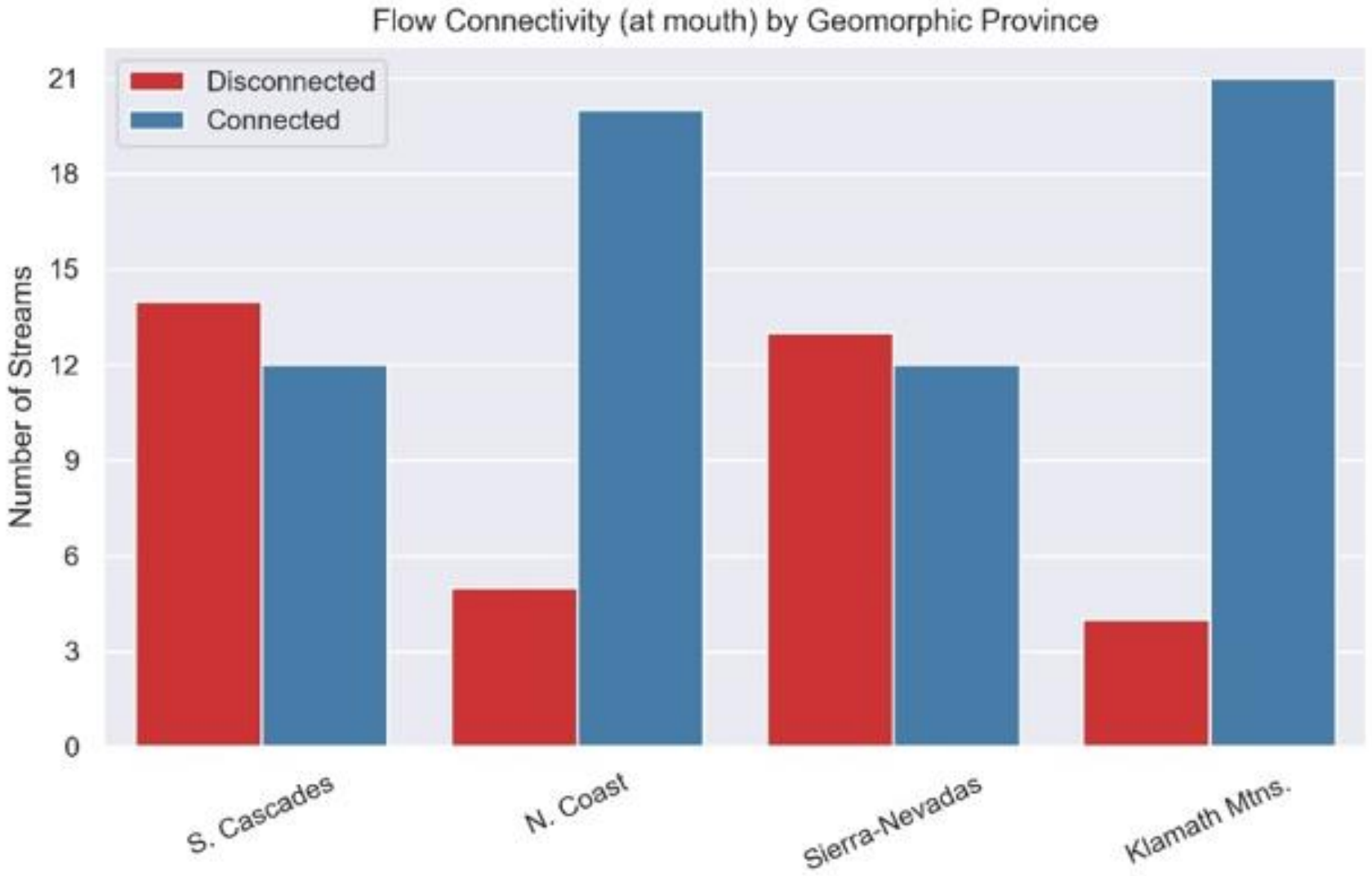
c) Conduct a pilot study to investigate the downstream propagation of water temperature from Class II-L systems in sites with contrasting lithology

- Field measurements and observations included:
  - bankfull width and depth (>10x per reach)
  - wetted width and depth (>10x per reach)
  - channel slope (available for ~75% of sites)
  - grain size distribution
- We conducted geospatial analysis and derived the following metrics for each of the streams surveyed:
  - contributing drainage area (DA)
  - channel slope
  - mean catchment elevation
  - catchment curvature
  - topographic wetness index (TWI)
  - integrated moisture index
  - heat load index
  - canopy coverage
  - canopy height
  - stream aspect
  - mean annual air temperature and precipitation

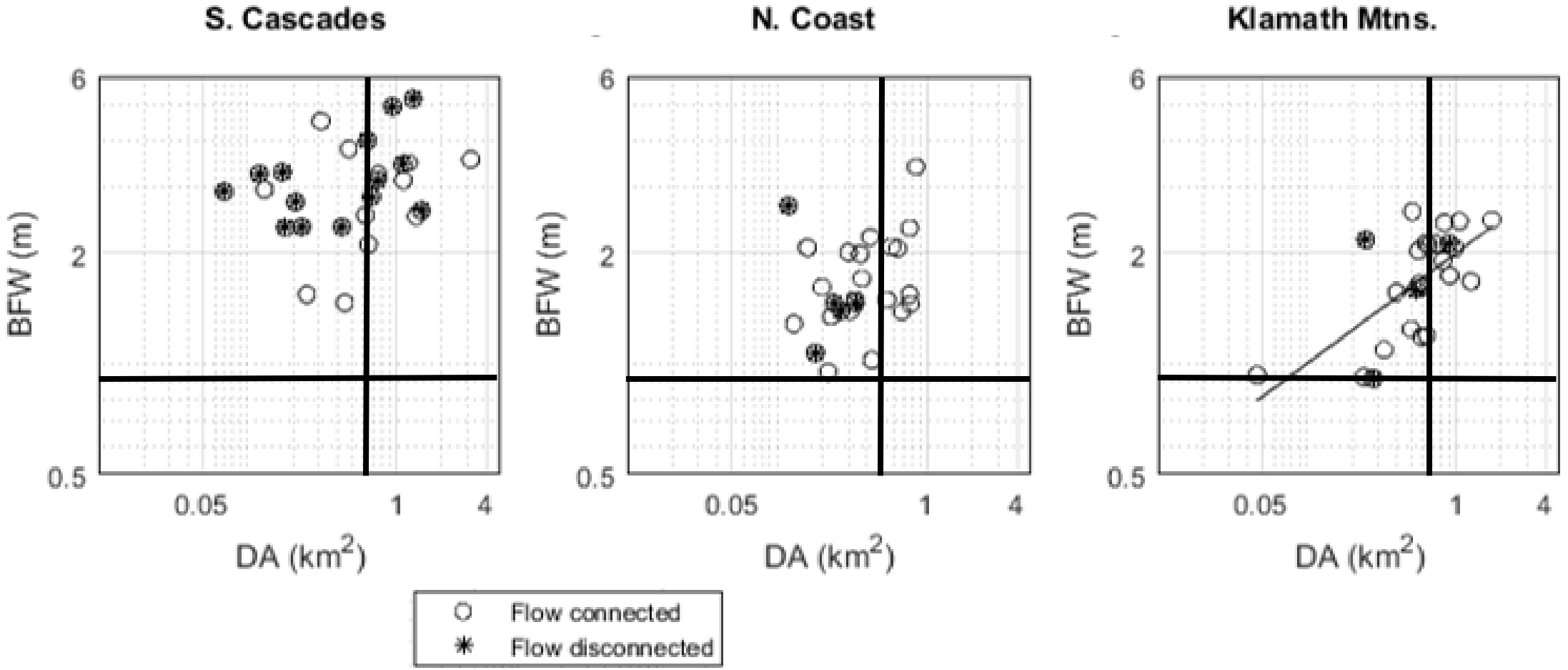
Longitudinal Pattern of Perennial Flow



Number of Streams Connected/Disconnected at Mouth by Geomorphic Province



Active Channel Width Versus Drainage Area



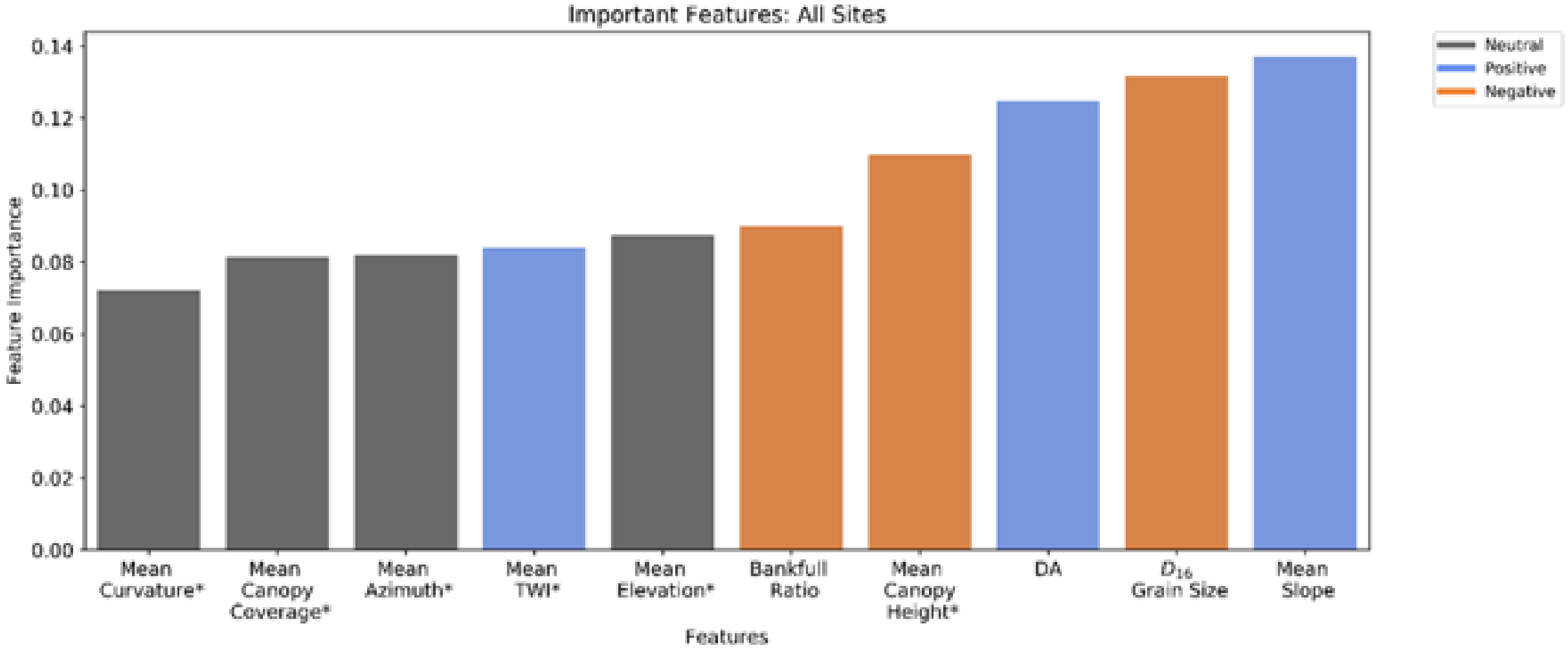


Fig. 5. Relative importance of covariates in model to predict network connectivity. The y-axis represents the modeled importance score of each of the top-ranking variables (i.e., features), where higher scores relate to greater dependency of the modeled prediction on that variable. These scores, however, are relative as they sum to a value of 1. Positive denotes increased probability that stream will be connected as variable increases; Negative denotes decreased probability that stream will be connected as variable increases; Neutral denotes a lack of dependency/ is neither positive or negative for our dataset.